

<110> Saha, K.	Saha, K.										
<120> Methods and Materials Relating to CD8-Tropic HIV-1	Methods and Materials Relating to CD8-Tropic HIV-1										
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160> 27											
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Gly Thr Met Leu Gly Met Leu Met Ile Cys Ser Ala Ala Asp Gln 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr 35 40 45

<211> 477

<212> PRT

<213> HIV-1

<400> 2



Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Thr Glu Val
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His Asn Ile Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Ser Pro 65 70 75 80

Gln Glu Ile Val Met Glu Asn Val Thr Glu Glu Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Glu Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115 120 125

Asn Cys Thr Thr Glu Leu Asn Leu Leu Asn Cys Ile Asp Asn Ser Thr 130 135 140

Asn Asp Lys Cys Ile Pro Pro Asp Gln Lys Gly Glu Met Lys Asn Cys 145 150 155 160

Ser Phe Asn Ile Thr Ala Gly Ile Arg Asn Lys Val Arg Lys Glu Tyr 165 170 175

Ala Leu Phe Tyr Thr Ser Asp Val Ala Pro Ile Asp Asn Asp Thr Ile . 180 185 190

Ser Tyr Arg Leu Ile Ser Cys Asn Thr Ser Ile Ile Thr Gln Ala Cys 195 200 205

Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala 210 215 220

Gly Phe Ala Ile Leu Lys Cys Lys Asp Arg Asn Phe Asn Gly Thr Gly 225 230 235 240

Leu Cys Lys Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro 245 250 255

Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Lys Glu 260 265 270

Ile Val Ile Arg Ser Glu Asn Phe Thr Asp Asn Ala Lys Thr Ile Ile 275 280 285

Val Gln Leu Pro Glu Ile Val His Ile Asn Cys Thr Arg Pro Asn Asn 290 295 300





Asn Ile Arg Lys Gly Leu Arg Ile Gly Pro Gly Arg Ala Trp Trp Tyr 305 310 315 320

Ala Thr Arg Gly Ile Ile Gly Lys Met Arg Gln Thr His Cys Asn Ile 325 330 335

Ser Arg Val Lys Trp Asn Asn Thr Leu Glu Gln Ile Val Lys Lys Leu 340 345 350

Gly Asp Lys Phe Gly Thr Asn Asn Lys Thr Ile Ile Phe Asn Gln 355 360 365

Ser Ser Gly Gly Asp Pro Glu Ile Thr Met His Thr Phe Asn Cys Gly $370 \hspace{1cm} 375 \hspace{1cm} 380$

Gly Glu Phe Phe Tyr Cys Asn Thr Thr Gln Leu Phe Asn Ser Thr Trp 385 390 395 400

Ile Arg Asn Gly Thr Asp Trp Thr Arg Asn Asp Thr Glu Gly Ser Asp 405 410 415

Ile Thr Asn Glu Asn Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile 420 425 430

Asn Met Trp Gln Lys Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Ser 435 440 445.

Gly Gln Ile Ser Cys Ser Ser Asn Ile Thr Gly Leu Leu Thr His
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Asp Gly Val Val Gly Leu Tyr Thr Asp Ala Asn Asn Val
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<211> 2652

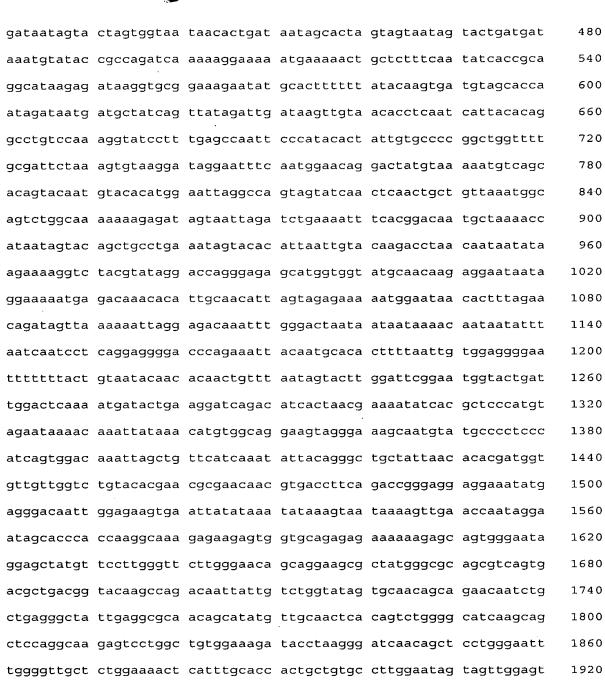
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<213> HIV-1

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1980

2040 2100

2160

2220

2280 2340

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gaaattgata attacacaag ctatatatac accttaattg aagaatcgca gaaccagcaa

gaaaagaatg aactagaatt attggaatta gacaaatggg acagtttgtg gagttggttt

agcataacaa actggctgtg gtatataaaa atattcataa tgatagtagg aggcttgata

ggtttaaaaa tagtttttag tgtgctttct atagtgaata gagttaggca gggatactca

ccattgtcgt ttcagacccg gccccagcc ccgaggggac ccgacaggcc cgaaggaatc

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<212> PRT

<213> HIV-1

<400> 4

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Gly Thr Ile Leu Leu Gly Met Leu Met Ile Cys Ser Ala Ala Asp Gln
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr 35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Thr Glu Val 50 55 60

His Asn Ile Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Ser Pro 65 70 75 80

Gln Glu Ile Val Met Glu Asn Val Thr Glu Glu Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Glu Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Thr Glu Leu Asn Leu Leu Asn Cys Ile Asp Asn Ser Thr 130 135 140

Ser Gly Asn Asn Thr Asp Asn Ser Thr Ser Ser Asn Ser Thr Asp Asp 145 150 155 160

Lys Cys Ile Pro Pro Asp Gln Lys Gly Lys Met Lys Asn Cys Ser Phe 165 170 175





Asn Ile Thr Ala Gly Ile Arg Asp Lys Val Arg Lys Glu Tyr Ala Leu · 180 185 190

Phe Tyr Thr Ser Asp Val Ala Pro Ile Asp Asn Asp Ala Ile Ser Tyr 195 200 205

Arg Leu Ile Ser Cys Asn Thr Ser Ile Ile Thr Gln Ala Cys Pro Lys 210 220

Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe 225 230 235 240

Ala Ile Leu Lys Cys Lys Asp Arg Asn Phe Asn Gly Thr Gly Leu Cys 245 250 255

Lys Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro Val Val
260 265 270

Ser Thr Gln Leu Leu Asn Gly Ser Leu Ala Lys Lys Glu Ile Val 275 280 285

Ile Arg Ser Glu Asn Phe Thr Asp Asn Ala Lys Thr Ile Ile Val Gln 290 295 300

Leu Pro Glu Ile Val His Ile Asn Cys Thr Arg Pro Asn Asn Asn Ile 305 . 310 315 320

Arg Lys Gly Leu Arg Ile Gly Pro Gly Arg Ala Trp Trp Tyr Ala Thr 325 330 335

Arg Gly Ile Ile Gly Lys Met Arg Gln Thr His Cys Asn Ile Ser Arg 340 345 350

Glu Lys Trp Asn Asn Thr Leu Glu Gln Ile Val Lys Lys Leu Gly Asp 355 360 365

Lys Phe Gly Thr Asn Asn Asn Lys Thr Ile Ile Phe Asn Gln Ser Ser 370 375 380

Gly Gly Asp Pro Glu Ile Thr Met His Thr Phe Asn Cys Gly Glu 385 390 395 400

Phe Phe Tyr Cys Asn Thr Thr Gln Leu Phe Asn Ser Thr Trp Ile Arg 405 410 415

Asn Gly Thr Asp Trp Thr Gln Asn Asp Thr Glu Gly Ser Asp Ile Thr 420 425 430





Asn Glu Asn Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met 435 440 445

Trp Gln Glu Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Ser Gly Gln 450 455 460

Ile Ser Cys Ser Ser Asn Ile Thr Gly Leu Leu Thr His Asp Gly
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Val Val Gly Leu Tyr Thr Asn Ala Asn Asn Val 485 490

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<211> 2571

<212> DNA

<213> HIV-1

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<210> 6

Met Arg Val Lys Glu Lys Tyr Gln His Leu Trp Arg Trp Gly Trp Arg
1 10 15

Trp Gly Thr Met Leu Gly Met Leu Met Ile Cys Ser Ala Thr Glu 20 25 30

Lys Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala 35 40 45

<211> 491

<212> PRT

<213> HIV-1

<400> 6





Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu 50 60

Val His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn 70 75 80

Pro Gln Glu Val Val Leu Val Asn Val Thr Glu Asn Phe Asn Met Trp 85 90 95

Lys Asn Asp Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp
100 105 110

Asp Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Ser 115 120 125

Leu Lys Cys Thr Asp Leu Lys Asn Asp Thr Asn Thr Asn Ser Ser Ser 130 135 140

Gly Arg Met Ile Met Glu Lys Gly Glu Ile Lys Asn Cys Ser Phe Asn 145 150 155 160

Ile Ser Thr Ser Ile Arg Gly Lys Val Gln Lys Glu Tyr Ala Phe Phe 165 170 175

Tyr Lys Leu Asp Ile Ile Pro Ile Asp Asn Asp Thr Thr Ser Tyr Lys 180 185 190

Leu Thr Ser Cys Asn Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys
200 205

Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro Cys Thr Asn Val Ser Thr 210 215 220

Val Gln Cys Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu 225 230 235 240

Leu Asn Gly Ser Leu Ala Glu Glu Glu Val Val Ile Arg Ser Val Asn 245 250 255

Phe Thr Asp Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Thr Ser Val 260 265 270

Glu Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Arg Ile Arg 275 280 285

Ile Gln Arg Gly Pro Gly Arg Ala Phe Val Thr Ile Gly Lys Ile Gly 290 295 300





Asn Met Arg Gln Ala His Cys Asn Ile Ser Arg Ala Lys Trp Asn Asn 305 310 315 320

Thr Leu Lys Gln Ile Ala Ser Lys Leu Arg Glu Gln Phe Gly Asn Asn 325 330 335

Lys Thr Ile Ile Phe Lys Gln Ser Ser Gly Gly Asp Pro Glu Ile Val 340 345 350

Thr His Ser Phe Asn Cys Gly Glu Phe Phe Tyr Cys Asn Ser Thr 355 360 365

Gln Leu Phe Asn Ser Thr Trp Phe Asn Ser Thr Trp Ser Thr Glu Gly 370 375 380

Ser Asn Asn Thr Glu Gly Ser Asp Thr Ile Thr Leu Pro Cys Arg Ile 385 390 395 400

Lys Gln Ile Ile Asn Met Trp Gln Lys Val Gly Lys Ala Met Tyr Ala 405 410 415

Pro Pro Ile Ser Gly Gln Ile Arg Cys Ser Ser Asn Ile Thr Gly Leu 420 425 430

Leu Leu Thr Arg Asp Gly Gly Asn Ser Asn Asn Glu Ser Glu Ile Phe
435
440
445

Arg Pro Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr 450 455 460

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Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg 485 490

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<211> 2580

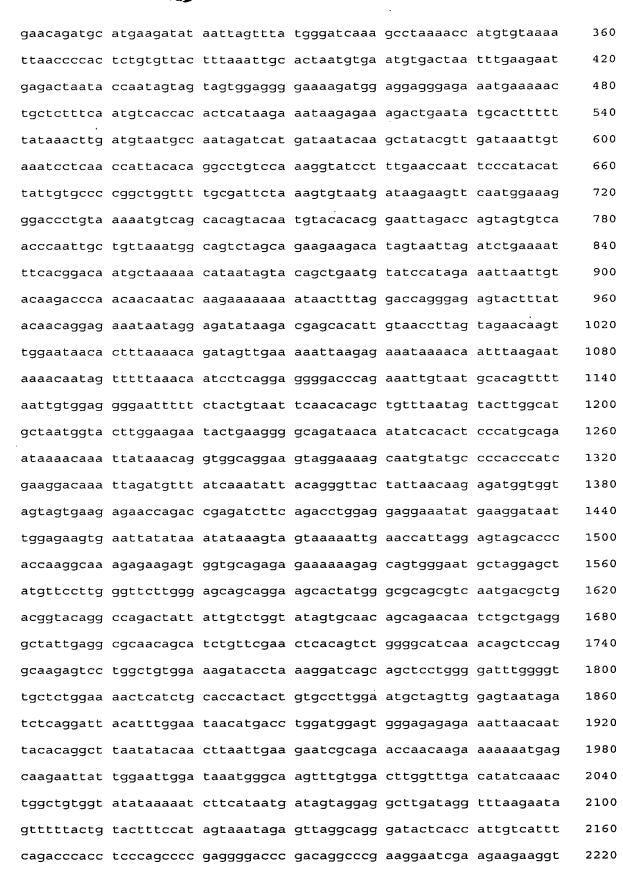
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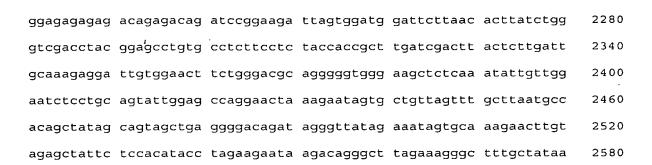
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<213> HIV-1

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Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His 50 55 60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln 65 70 75 80

Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn 85 90 95

Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln 100 105 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn 115 120 125

Cys Thr Asn Val Asn Val Thr Asn Leu Lys Asn Glu Thr Asn Thr Asn 130 135 140

Ser Ser Ser Gly Glu Lys Met Glu Glu Glu Glu Met Lys Asn Cys 145 150 155 160

Ser Phe Asn Val Thr Thr Leu Ile Arg Asn Lys Arg Lys Thr Glu Tyr 165 170 175





Ala Leu Phe Tyr Lys Leu Asp Val Met Pro Ile Asp Arg Asp Asn Thr 180 185 190

Ser Tyr Thr Leu Ile Asn Cys Lys Ser Ser Thr Ile Thr Gln Ala Cys 195 200 205

Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala 210 215 220

Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Asn Gly Lys Gly 225 230 235 240

Pro Cys Lys Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro 245 250 255

Val Val Ser Thr Gln Leu Leu Asn Gly Ser Leu Ala Glu Glu Asp 260 265 270

Ile Val Ile Arg Ser Glu Asn Phe Thr Asp Asn Ala Lys Asn Ile Ile 275 280 285

Val Gln Leu Asn Val Ser Leu Glu Ile Asn Cys Thr Arg Pro Asn Asn 290 295 300

Asn Thr Arg Lys Lys Ile Thr Leu Gly Arg Ser Arg Val Leu Tyr Thr 305 310 315 320

Thr Gly Glu Ile Ile Gly Asp Ile Arg Arg Ala His Cys Asn Leu Ser 325 330 335

Arg Thr Ser Trp Asn Asn Thr Leu Lys Gln Ile Val Glu Lys Leu Arg 340 345 350

Glu Ile Lys Gln Phe Lys Asn Lys Thr Ile Val Phe Lys Gln Ser Ser 355 360 365

Gly Gly Asp Phe Glu Ile Val Met His Ser Phe Asn Cys Gly Glu 370 380

Phe Phe Tyr Cys Asn Ser Thr Gln Leu Phe Asn Ser Thr Trp His Ala 385 390 395 400

Asn Gly Thr Trp Lys Asn Thr Glu Gly Ala Asp Asn Asn Ile Thr Leu 405 410 415

Pro Cys Arg Ile Lys Gln Ile Ile Asn Arg Trp Gln Glu Val Gly Lys 420 425 430





Ala Met Tyr Ala Pro Pro Ile Glu Gly Gln Ile Arg Cys Leu Ser Asn 435 440 445

Ile Thr Gly Leu Leu Thr Arg Asp Gly Gly Ser Ser Glu Glu Asn 450 455 460

Gln Thr Glu . 465

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<211> 2553

<212> DNA

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1380



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Gln His Ser Leu Trp Arg Trp Gly Ile Met Leu Leu Gly Met Leu Met 20 25 30

Ile Cys Lys Gly Glu Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val
35 40 45

Trp Lys Glu Ala Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ser 50 60



Tyr Glu Pro Glu Ala His Asn Ile Trp Ala Thr His Ala Cys Val Pro 65 70 75 80

Thr Asp Pro Asn Pro Arg Glu Ile Lys Leu Glu Asn Val Thr Glu Asn 85 90 95

Phe Asn Met Trp Lys Asn Asp Met Val Glu Gln Met His Glu Asp Val 100 105 110

Ile Ser Leu Trp Asp Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro 115 120 125

Leu Cys Val Thr Leu His Cys Thr Glu Tyr Lys Ala Pro Asn Ala Thr 130 135 140

Ile Asn Ala Thr Asp Arg Asp Ile Gly Met Lys Asn Cys Ser Phe Asn 145 150 155 160

Val Thr Thr Glu Val Ile Asn Lys Lys Gln Glu His Ala Leu Phe
165 170 175

Tyr Lys Leu Asp Val Val Gln Met Asp Asp Asn Ser Thr Asn Thr Asn 180 185 190

Tyr Arg Leu Ile Asn Cys Asn Thr Ser Val Ile Thr Gln Ala Cys Pro 195 200 205

Lys Val Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly 210 215 220

Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Asn Gly Thr Gly Pro 225 230 235 240

Cys Lys Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro Val 245 250 255

Val Ser Thr Gln Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile 260 265 270

Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile Ile Val 275 280 285

Gln Leu Asn Glu Ser Val Pro Ile Asn Cys Ser Arg Pro Tyr Glu Asn 290 295 300

Lys Arg Arg Thr Pro Ile Gly Leu Gly Gln Tyr Tyr Thr Thr Lys 305 310 315 320





Leu Lys Gly Tyr Ile Arg Pro Ala His Cys Asn Ile Ser Gly Ala Glu 325 330 335

Trp Asn Lys Thr Leu Gln Gln Val Ala Lys Lys Leu Gly Asp Leu Phe 340 345 350

Asn Gln Thr Thr Ile Ile Phe Gln Pro His Ser Gly Gly Asp Pro Glu 355 360 365

Ile Thr Thr His Ser Phe Asn Cys Gly Glu Phe Phe Tyr Cys Asp 370 375 380

Thr Ser Arg Leu Phe Asn Arg Thr Tyr Ser Thr Ser Gly Ser Thr Gly 385 390 395 400

Val Asn Asn Ser Thr Ile Lys Leu Pro Cys Arg Ile Lys Gln Ile Ile 405 410 415

Asn Met Trp Gln Gly Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Glu 420 425 430

Gly Leu Ile Lys Cys Ser Ser Asn Ile Thr Gly Leu Leu Thr Arg 435 440 445

Asp Gly Gly Asn Asn Thr Arg Gln Asn Glu Ala Phe Arg Pro Gly Gly 450 460

Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val 465 470 475 480

Val Arg Ile Glu Pro Leu Gly Leu Ala Pro Thr Glu Ala Lys Arg Arg 485 490 495

Val Val Glu Arg Glu Lys Arg Ala Ile Gly Leu Gly Ala Met Phe Leu 500 505 510

Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr 515 520 525

Leu Thr Val Gln Ala Arg Gln Leu Met Ser Gly Ile Val Gln Gln 530 535 . 540

Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Thr 545 550 555 560

Leu Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu 565 570 575



Ser Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly 580 585 590

Arg His Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn 595 600 605

Lys Ser Leu Asn Glu Ile Trp Gly Asn Met Thr Trp Met Glu Trp Glu 610 620

Lys Glu Ile Asp Asn Tyr Thr Glu Leu Ile Tyr Ser Leu Ile Glu Glu 625 630 635 640

Ser Gln Thr Gln Glu Lys Asn Glu Gln Glu Leu Lys Leu Asp
645 650 655

Gln Trp Ala Ser Leu Trp Asn Trp Phe Ser Ile Thr Lys Trp Leu Trp
660 665 670

Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg 675 680 685

Ile Val Phe Ala Val Leu Ser Val Val Asn Arg Val Arg Gln Gly Tyr 690 695 700

Ser Pro Leu Ser Phe Gln Thr Leu Leu Pro Ala Pro Arg Gly Pro Asp 705 710 715 720

Arg Pro Glu Gly Ile Glu Glu Gly Gly Glu Gln Gly Arg Gly Arg
725 730 735

Ser Ile Arg Leu Val Thr Gly Phe Ser Ala Leu Ile Trp Asp Asp Leu 740 745 750

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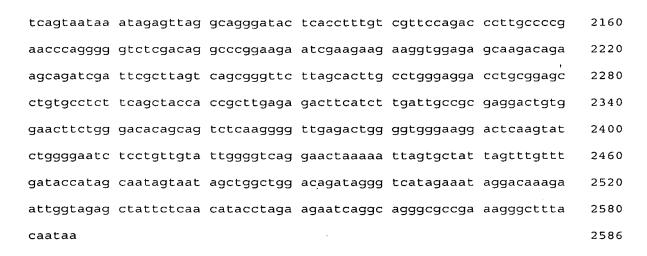
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<212> PRT

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Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His 50 55 60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln 65 70 75 80

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Asn Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp Gln
100 105 110

Ser Leu Lys Pro Cys Val Gln Leu Thr Pro Leu Cys Val Thr Leu Asp 115 120 125

Cys Thr Asp Ala Thr Asn Ala Thr Asn Thr Thr Ile Ile Ser Asp Met 130 140

Lys Gly Glu Ile Lys Asn Cys Ser Phe Asn Met Thr Thr Glu Leu Lys 145 150 155 160



Asp Lys Thr Gln Lys Val Arg Ser Phe Phe Tyr Lys Met Asp Ile Val

Gln Ile Asn Asn Asn Asn Asn Ser Asn Ser Asn Ser Ser Gln Tyr Arg 180 185 190

Leu Ile Ser Cys Asn Thr Ser Val Ile Thr Gln Ala Cys Pro Lys Val 195 200 205

Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala 210 215 220

Ile Leu Lys Cys Lys Asp Lys Glu Phe Asn Gly Thr Gly Pro Cys Arg 225 230 235 240

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser 245 250 255

Thr Gln Leu Leu Asn Gly Ser Leu Ala Glu Glu Lys Val Met Ile 260 265 270

Arg Ser Glu Asn Ile Thr Asp Asn Thr Lys Asn Ile Ile Val Gln Leu 275 280 285

Thr Glu Pro Val Lys Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg . 290 295 300

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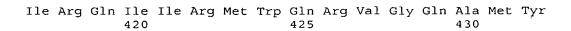
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Thr Thr Gly Leu Phe Asn Ser Thr Trp Ala Ser Asn Ala Ser Thr Gln 385 390 395 400

Gly Ser Asn Ser Thr Gly Ser Asn Asp Thr Ile Thr Leu Gln Cys Arg 405 410 415



Ala Pro Pro Ile Pro Gly Val Ile Arg Cys Asp Ser Asn Ile Thr Gly 435 440 445

Leu Ile Leu Thr Arg Asp Gly Gly Asp Asn Asn Ser Thr Asn Glu Thr 450 455 460

Phe Arg Pro Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu 465 470 475 480

Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala Pro Thr 485 490 495

Arg Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Ile Ala Gly 500 505 510

Ile Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met 515 520 525

Gly Ala Ala Ser Leu Thr Leu Thr Val Gln Thr Arg Gln Leu Leu Ser 530 540

Gly Ile Val Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln 545 550 555 560

Gln His Leu Leu Lys Thr Leu Val Trp Gly Ile Lys Gln Leu Gln Ala
565 570 575

Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly 580 585 590

Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Thr Val Pro Trp 595 600 605

Asn Ser Ser Trp Ser Asn Lys Ser Tyr Ser Glu Ile Trp Asp Asn Met 610 615 620

Thr Trp Leu Gln Glu Trp Lys Glu Ile Ser Asn Tyr Thr Gln Ile Ile 625 630 635 640

Tyr Asp Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln 645 650 655

Asp Leu Leu Ala Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe Asp 660 665 670

Ile	Ser	Lys 675	Trp	Leu	Trp	Tyr	Ile 680	Arg	Ile	Phe	Ile	Met 685	Ile	Val	Gly
Gly	Leu 690	Ile	Gly	Leu	Arg	Ile 695	Val	Phe	Ala	Val	Ile 700	Ser	Val	Ile	Asn
Arg 705	Val	Arg	Gln	Gly	Tyr 710	Ser	Pro	Leu	Ser	Phe 715	Gln	Thr	Leu	Ala	Pro 720
Asn	Pro	Gly	Gly	Leu 725	Asp	Arg	Pro	Gly	Arg 730	Ile	Glu	Glu	Glu	Gly 735	Gly
Glu	Gln	Asp	Arg 740	Ser	Arg	Ser	Ile	Arg 745	Leu	Val	Ser	Gly	Phe 750	Leu	Ala
Leu	Ala	Trp-	Glu	Asp	Leu	Arg	Ser 760	Leu	Cys	Leu	Phe	Ser 765	Tyr	His	Arg
Leu	Arg 770	Asp	Phe	Ile	Leu	Ile 775	Ala	Ala	Arg	Thr	Val 780	Glu	Leu	Leu	Gly
His 785	Ser	Ser	Leu	Lys	Gly 790	Leu	Arg	Leu	Gly	Trp 795	Glu	Gly	Leu	Lys	Tyr 800
Leu	Gly	Asn	Leu	Leu 805	Leu	Tyr	Trp	Gly	Gln 810	Glu	Leu	Lys	Ile	Ser 815	Ala
Ile	Ser	Leu	Phe 820	Asp	Thr	Ile	Ala	Ile 825	Val	Ile	Ala	Gly	Trp 830	Thr	Asp
Arg	Val	Ile 835	Glu	Ile	Gly	Gln	Arg 840	Ile	Gly	Arg	Ala	Ile 845	Leu	Asn	Ile
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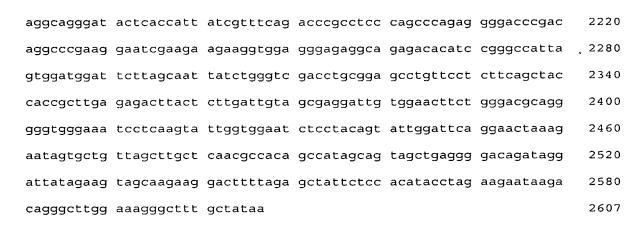
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<211> 866

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Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Ala His 50 55 60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln 65 70 75 80

Glu Ile Val Leu Ala Asn Val Thr Glu Asp Phe Asn Met Trp Lys Asn 85 90 95

Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln
100 105 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn 115 120 125

Cys Thr Asp Val Arg Asn Gly Thr Ile Val Arg Asn Ser Thr Ile Arg 130 135 140

Val Glu Glu Gly Met Lys Glu Glu Ile Lys Asn Cys Ser Phe Asn Val 145 150 155 160



•

Thr Thr Ser Met Gly Asp Lys Leu Gln Lys Glu Asp Ala Phe Phe Tyr 165 170 175

Lys Ser Asp Val Val Gln Met Gly Asp Asn Asn Asn Thr Asn Thr Ser 180 185 190

Asn Asn Asn Ile Thr Tyr Thr Ser Tyr Arg Leu Arg Ser Cys Asn Thr 195 200 205

Ser Val Ile Thr Gln Ala Cys Pro Lys Ile Asn Phe Glu Pro Ile Pro 210 220

Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asn 225 230 235 240

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Cys Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn 260 265 270

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Pro Gly Ala Val Tyr Tyr Thr Thr Gly Asp Ile Ile Gly Asp Ile Arg 325 330 335

Arg Ala His Cys Asn Ile Ser Lys Glu Asp Trp Thr Asn Thr Leu Lys 340 345 350

Gln Ile Ala Lys Lys Leu Arg Glu Gln Phe Gly Asp Asn Lys Thr Ile 355 360 365

Ala Phe Lys Pro Ser Ser Gly Gly Asp Pro Glu Ile Val Met His Ser 370 380

Phe Asn Cys Gly Glu Phe Phe Tyr Cys Asn Thr Thr Lys Leu Phe 385 390 395 400

Asn Ser Thr Trp Phe Gly Asn Ser Thr Arg Asn Asn Thr Glu Gly Ser 405 410 415





Ser Asn Asn Gly Asn Ile Thr Leu Gln Cys Arg Ile Lys Gln Ile Ile 420 425 430

Asn Met Trp Gln Gly Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Arg 435 440 445

Gly Gln Ile Arg Cys Ser Ser Asn Ile Thr Gly Leu Leu Thr Arg 450 460

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Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr 485 490 495

Lys Val Val Lys Ile Glu Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys 500 505 510

Arg Arg Val Val Gln Arg Glu Lys Arg Ala Met Gly Ile Gly Ala Leu 515 520 525

Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser 530 540

Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln 545 550 555 560

Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln His His Leu Leu 565 570 575

Gln Thr Leu Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala 580 585 590

Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys 595 600 605

Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ala Ser Trp 610 615 620

Ser Asn Lys Ser Leu Asp Lys Ile Trp Asn Asn Met Thr Trp Met Gln 625 630 635 640

Trp Glu Arg Glu Ile Asp Asn Tyr Thr Ser Leu Ile Tyr Thr Leu Ile 645 650 655

Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Leu Glu Leu Glu 660 665 670





Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe Asp Ile Thr Lys Trp 680

Leu Trp Tyr Ile Lys Ile Phe 695

Leu Arg Ile Val Phe Val Ile Leu Ser Ile Val Asn Arg Val Arg Gln 720

Gly Tyr Ser Pro Leu Ser Phe Gln Thr Arg Leu Pro Ala Gln Arg Gly
725 730 735

Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu Gly Gly Arg Gly Arg
740 745 750

Asp Thr Ser Gly Pro Leu Val Asp Gly Phe Leu Ala Ile Ile Trp Val 755 760 765

Asp Leu Arg Ser Leu Phe Leu Phe Ser Tyr His Arg Leu Arg Asp Leu 770 780

Leu Leu Ile Ala Thr Arg Ile Val Glu Leu Leu Gly Arg Arg Gly Trp 785 790 795 800

Glu Ile Leu Lys Tyr Trp Trp Asn Leu Leu Gln Tyr Trp Ile Gln Glu 805 810 815

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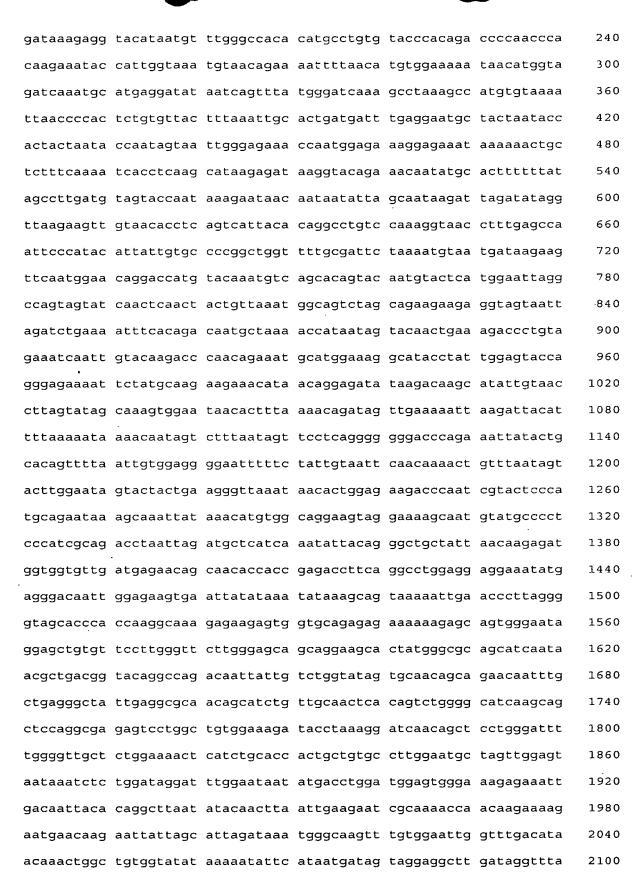
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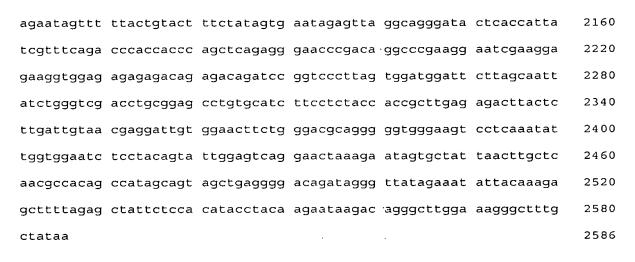
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<211> 855

<212> PRT

<213> HIV-1

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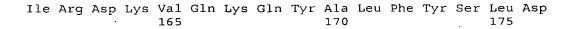
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Lys Leu Thr Pro Leu Cys Val Thr Leu Asn Cys Thr Asp Asp Leu Arg 115 120 125

Asn Ala Asn Asn Thr Thr Thr Asn Thr Asn Ser Asn Trp Glu Lys Pro 130 140

Met Glu Lys Gly Glu Ile Lys Asn Cys Ser Phe Lys Ile Thr Ser Ser 145 150 155 160



Val Val Pro Ile Lys Asn Asn Asn Ile Ser Asn Lys Ile Arg Tyr 180 185 190

Arg Leu Arg Ser Cys Asn Thr Ser Val Ile Thr Gln Ala Cys Pro Lys 195 200 205 .

Val Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe 210 220

Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys 225 230 235 240

Thr Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Asn Val Val 245 250 255

Ser Thr Gln Leu Leu Asn Gly Ser Leu Ala Glu Glu Val Val 260 265 270

Ile Arg Ser Glu Asn Phe Thr Asp Asn Ala Lys Thr Ile Ile Val Gln 275 280 285 ·

Leu Lys Asp Pro Val Glu Ile Asn Cys Thr Arg Pro Asn Arg Asn Ala 290 295 300

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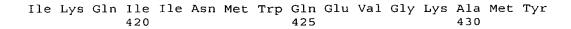
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Cys Asn Ser Thr Lys Leu Phe Asn Ser Thr Trp Phe Ser Thr Thr Glu 385 390 395 400

Gly Leu Asn Asn Thr Gly Asn Glu Asp Pro Ile Val Leu Pro Cys Arg 405 410 415



Ala Pro Pro Ile Ala Asp Leu Ile Arg Cys Ser Ser Asn Ile Thr Gly
435
440
445

Leu Leu Leu Thr Arg Asp Gly Gly Val Asp Glu Asn Ser Asn Thr Thr 450 455 460

Glu Thr Phe Arg Pro Gly Gly Gly Asn Met Arg Asp Asn Trp Arg Ser 465 470 475 . 480

Glu Leu Tyr Lys Tyr Lys Ala Val Lys Ile Glu Pro Leu Gly Val Ala
485
490
495

Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg Ala Val 500 505 510

Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr 515 520 525

Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu 530 540

Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala 545 550 555 560

Gln Gln His Leu Leu Gln Thr Leu Val Trp Gly Ile Lys Gln Leu Gln 565 570 575

Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu 580 585 590

Gly Phe Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro 595 600 605

Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Asp Arg Ile Trp Asn Asn 610 615 620

Met Thr Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Gly Leu 625 630 635 640

Ile Tyr Asn Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu 645 650 655

Gln Glu Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe 660 665 670



Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val 675 680 685

Gly Gly Leu Ile Gly Leu Arg Ile Val Phe Thr Val Leu Ser Ile Val 690 695 700

Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr His His 705 710 715 720

Pro Ala Gln Arg Glu Pro Asp Arg Pro Glu Gly Ile Glu Gly Gly Gly . 725 730 735

Gly Glu Arg Asp Arg Asp Arg Ser Gly Pro Leu Val Asp Gly Phe Leu 740 745 750

Ala Ile Ile Trp Val Asp Leu Arg Ser Leu Cys Ile Phe Leu Tyr His
755 760 765

Arg Leu Arg Asp Leu Leu Leu Ile Val Thr Arg Ile Val Glu Leu Leu 770 780

Gly Arg Arg Gly Trp Glu Val Leu Lys Tyr Trp Trp Asn Leu Leu Gln
785 790 795 800

Tyr Trp Ser Gln Glu Leu Lys Asn Ser Ala Ile Asn Leu Leu Asn Ala 805 810 815

Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Val Ile Glu Ile Leu 820 825 830

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<211> 2571

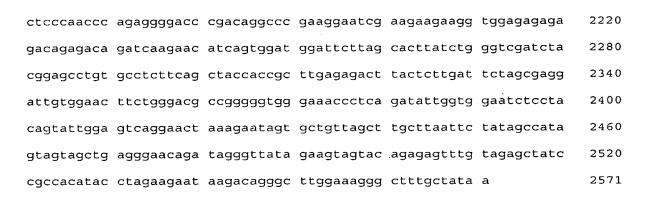
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Leu Phe Cys Ala Ser Asp Ser Lys Ala Tyr Asp Thr Glu Ala His Asn 50 55 60

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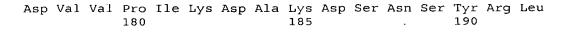
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Thr Asp Tyr Glu Gly Asn Ala Asn Asn Thr Ile Asp Asn Ala Thr Lys 130 135 140

Asn Ser Trp Lys Gly Glu Ile Lys Asn Cys Thr Phe Asn Val Thr Thr 145 150 155 160

Ala Ile Arg Asp Lys Val Lys Lys Gln Tyr Ala Leu Phe His Ser Leu 165 170 175



Ile Ser Cys Asn Thr Ser Val Ile Thr Gln Ala Cys Pro Lys Val Ser 195 200 205

Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile 210 215 220

Leu Lys Cys Asn Asn Lys Thr Phe Ser Gly Lys Gly Gln Cys Lys Asn 225 230 235 240

Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro Val Ala Ser Thr
245 250 255

Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Lys Asp Ile Ile Ile Arg ... 260 265 270

Ser Asp Asn Phe Ser Asp Asn Ala Lys Ile Ile Ile Val Gln Leu Lys 275 280 285

Glu Pro Val Glu Ile Asn Cys Thr Arg Pro Gly Asn Asn Thr Arg Lys 290 295 300

Ser Ile His Ile Gly Pro Gly Arg Ala Trp Tyr Ala Thr Gly Asp Ile 305 310 315 320

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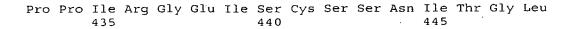
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Val Met His Ser Phe Asn Cys Gly Glu Phe Phe Tyr Cys Asn Ala 370 375 380

Thr Gln Leu Phe Asn Ser Thr Trp Phe Asn Gly Thr Trp Asn Asn Ser 385 390 395 400

Thr Trp Asn Glu Thr Asp Thr Thr Thr Ile Thr Leu Pro Cys Arg Ile 405 410 415

Lys Gln Ile Val Asn Met Trp Gln Thr Val Gly Arg Ala Met Tyr Ala 420 425 430



Leu Leu Thr Arg Asp Gly Gly Asn Ile Asn Glu Thr Asn Gly Thr Glu 450 460

Ile Phe Arg Pro Ala Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu 465 470 475 480

Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Ile Ala Pro
485 490 495

Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg Ala Val Gly 500 505 510

Val Gly Ala Met Phe Leu Gly Phe Leu Ser Ala Ala Gly Ser Thr Met 515 520 525

Gly Ala Ala Ser Val Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser 530 535 540

Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln 545 550 550

Gln His Leu Leu Gln Thr Leu Val Trp Gly Ile Lys Gln Leu Gln Ala 565 570 575

Arg Val Leu Ala Val Glu Arg Tyr Leu Gly Asp Gln Gln Leu Leu Gly 580 585 590

Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Thr Val Pro Trp 595 600 605

Asn Thr Ser Trp Ser Asn Lys Ser Leu Lys Tyr Ile Trp Asp Asn Met 610 620

Thr Trp Met Gln Trp Asp Lys Glu Ile Ser Asn Tyr Thr Gly Leu Ile 625 630 635 640

Tyr Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Lys 645 650 655

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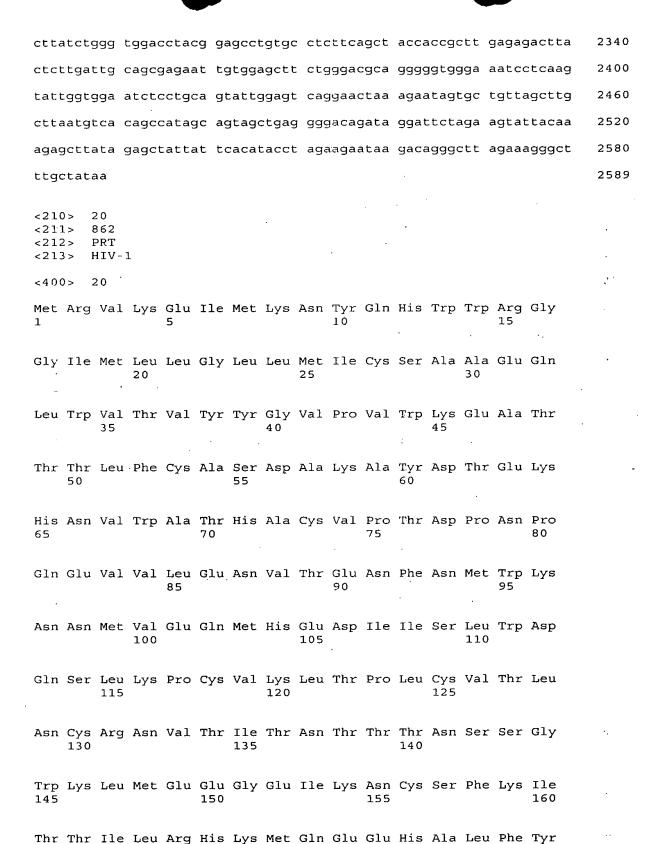
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Gly Leu Ile Gly Leu Arg Ile Val Phe Thr Val Leu Ser Ile Val Asn 690 695 700 Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Arg Leu Pro Thr Gln Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Gly Gly Glu Arg Asp Arg Asp Arg Ser Arg Thr Ser Val Asp Gly Phe Leu Ala 745 Leu Ile Trp Val Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg 760 Leu Arg Asp Leu Leu Leu Ile Leu Ala Arg Ile Val Glu Leu Leu Gly 775 780 Arg Arg Gly Trp Glu Thr Leu Arg Tyr Trp Trp Asn Leu Leu Gln Tyr 785 790 795 Trp Ser Gln Glu Leu Lys Asn Ser Ala Val Ser Leu Leu Asn Ser Ile 805 810 Ala Ile Val Val Ala Glu Gly Thr Asp Arg Val Ile Glu Val Val Gln 825 Arg Val Cys Arg Ala Ile Arg His Ile Pro Arg Arg Ile Arg Gln Gly 835 840 Leu Glu Arg Ala Leu Leu 850

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gatacagaga aacataatgt ttgggccaca catgcctgtg tacctacaga ccccaaccca 240
caagaagtag tattggaaaa tgtgacagaa aattttaaca tgtggaaaaa taacatggta 300
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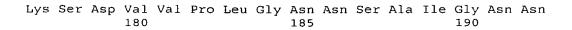
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170

175

165



Asn Ala Arg Tyr Arg Leu Ile Ser Cys Asn Thr Ser Thr Ile Thr Gln
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Ala Cys Pro Lys Val Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala 210 215 220

Pro Ala Gly Phe Ala Ile Leu Lys Cys Arg Asp Lys Lys Phe Asn Gly 225 230 235 240

Thr Gly Pro Cys Lys Asp Val Ser Thr Val Gln Cys Thr His Gly Ile 245 250 255

Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu 260 265 270

Glu Asp Ile Val Ile Arg Ser Ala Asn Phe Ser Asp Asn Ala Lys Ile 275 280 285

Ile Ile Val Gln Leu Asn Lys Thr Val Val Ile Asn Cys Thr Arg Pro 290 295 300

Asn Asn Asn Thr Arg Lys Gly Ile Asn Ile Gly Pro Gly Arg Thr Val 305 310 315 320

Tyr Ala Thr Gly Lys Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn 325 330 335

Ile Ser Lys Gly Glu Trp Tyr Asn Thr Leu Lys Gln Val Val Thr Lys 340 345 350

Leu Gly Glu His Phe Lys Asn Lys Thr Ile Ala Phe Asn Lys Ser Ser 355 360 365

Gly Gly Asp Pro Glu Ile Val Lys His Thr Phe Asn Cys Gly Glu 370 375 380

Phe Phe Tyr Cys Asp Ser Thr Lys Leu Phe Thr Ser Thr Trp Asn Tyr 385 390 395 400

Thr Asn Gly Thr Trp Asn Ser Thr Asn Trp Asn Asp Thr Glu Met Leu 405 410 415

Asn Lys Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Val Asn Met 420 425 430



Trp Gln Glu Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Ser Gly Leu
435 440 445

Ile Thr Cys Ser Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly 450 460

Gly Ser Asn Thr Asn Thr Thr Glu Val Phe Arg Pro Gly Gly Asn 465 470 475 480

Met Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys 485 490 495

Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val
500 505 510

Gln Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Leu Phe Leu Gly Phe 515 520 525

Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Leu Thr Leu Thr 530 540

Val Gln Thr Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn 545 550 555 560

Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Thr Leu Val . 565 570 575

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Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu 595 600 605 .

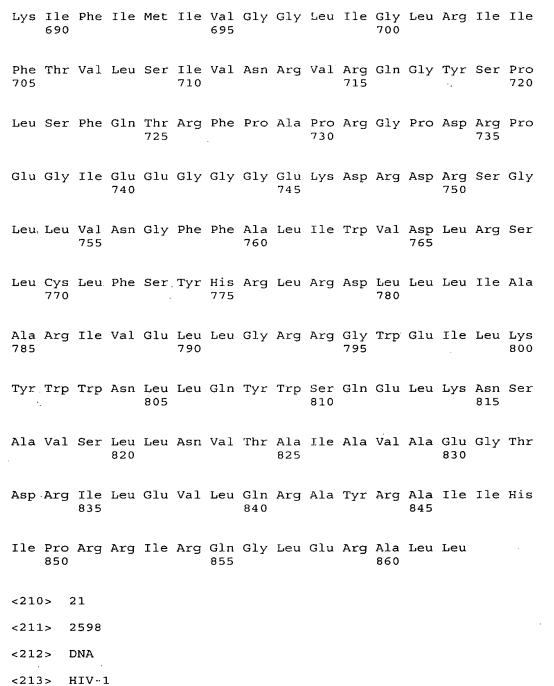
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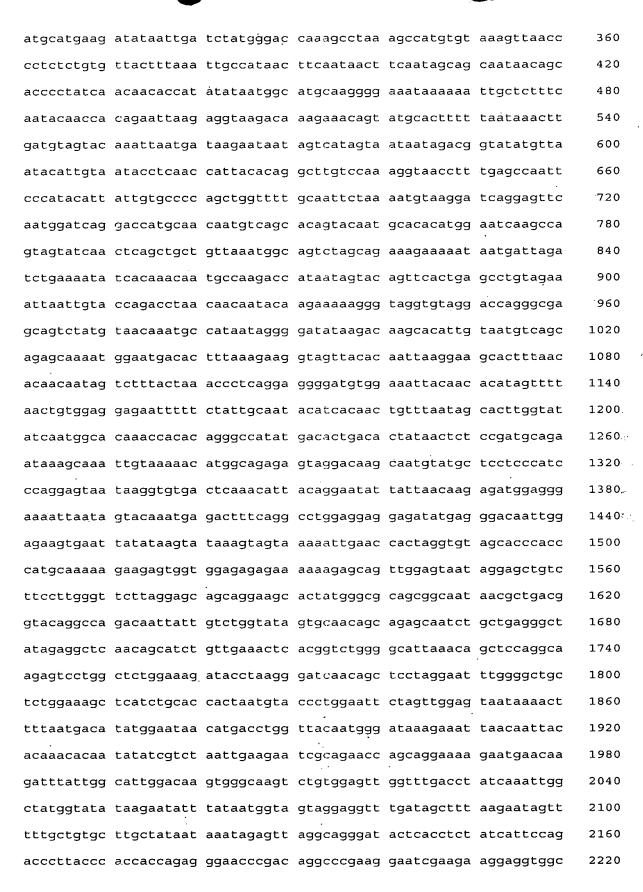
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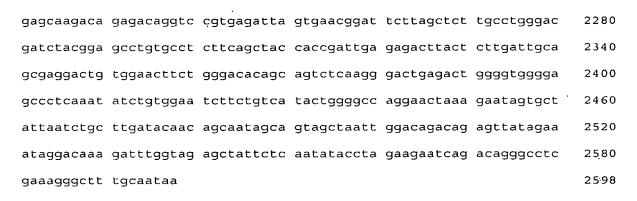
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Ala Ser Leu Trp Asp Trp Phe Ser Ile Ser Asn Trp Leu Trp Tyr Ile 675 680 685



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Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Glu Thr Thr Leu 35 40 45

Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His Asn Val 50 55 60

Trp Ala Thr His Ala Cys Val Pro Thr Phe Pro Asn Pro Gln Glu Ile
65 70 75 80

Pro Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asn Met 85 90 95

Val Glu Gln Met His Glu Asp Ile Ile Ser Asp Trp Asp Gln Ser Leu 100 105 110

Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn Cys Thr 115 120 125 .

His Asn Phe Asn Asn Phe Asn Ser Ser Asn Asn Ser Thr Pro Ile Asn 130 135 140

Asn Thr Ile Tyr Asn Gly Met Gln Gly Glu Ile Lys Asn Cys Ser Phe 145 150 155 160

Asn Thr Thr Glu Leu Arg Gly Lys Thr Lys Lys Gln Tyr Ala Leu

165 170 175

Phe	Asn	Lys	Leu 180	Asp	Val	Val	Gln	Ile 185	Asn	Asp	Lys	Asn	Asn 190	Ser	His
Ser	Asn	Asn 195	Arg	Arg	Tyr	Met	Leu 200	Ile	His	Cys	Asn	Thr 205	Ser	Val	Ile
Thr	Gln 210	Ala	Cys	Pro	Lys	Val 215	Thr	Phe	Glu	Pro	Ile 220	Pro	Ile	Tyr	Tyr
Cys 225	Ala	Pro	Ala	Gly	Phe 230	Ala	Ile	Leu	Lys	Cys 235	Lys	Asp	Gln	Glu	Phe 240
Asn	Gly	Ser	Gly	Pro 245	Cys	Asn	Asn	Val	Ser 250	Thr	Val	Gln	Cys	Thr 255	His
Gly	Ile	Lys	Pro 260	Val	Val	Ser	Thr	Gln 265	Leu	Leu	Leu	Asn	Gly 270	Ser	Leu
Ala	Glu	Arg 275	Lys	Ile	Met	Ile	Arg 280	Ser	Glu	Asn	Ile	Thr 285	Asn	Asn	Ala
Lys	Thr 290	Ile	Ile	Val	Gln	Phe 295	Thr	Glu	Pro	Val	Glu 300	Ile	Asn	Cys	Thr
Arg 305	Pro	Asn	Asn	Asn	Thr 310	Arg	Lys	Arg	Val	Gly 315		Gly	Pro	Gly	Arg 320
Ala	Val	Tyr	Val	Thr 325	Asn	Ala	Ile	Ile	Gly 330	Asp	Ile	Arg	Gln	Ala 335	Tyr
His	Asn	Val	Ser 340	Arg	Ala	Lys	Trp	Asn 345	Asp	Thr	Leu	Lys	Lys 350	Val	Val
Thr	Gln	Leu 355	Arg	Lys	His	Phe	Asn 360	Thr	Thr	Ile	Val	Phe 365	Thr	Lys	Pro
Ser	Gly 370	Gly	Asp	Val	Glu	Ile 375	Thr	Thr	His	Ser	Phe 380	Asn	Cys	Gly	Gly
Glu 385	Phe	Phe	Tyr	Cys	Asn 390	Thr	Ser	Gln	Leu	Phe 395	Asn	Ser	Thr	Trp	Ile 400
Ile	Asn	Gly	Thr	Asn 405	His	Thr	Gly	Pro	Tyr 410	Asp	Thr	Asp	Thr	Ile 415	



Leu Arg Cys Arg Ile Lys Gln Ile Val Lys Thr Trp Gln Arg Val Gly
420 . 425 430

Gln Ala Met Tyr Ala Pro Pro Ile Pro Gly Val Ile Arg Cys Asp Ser 445 445

Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly Gly Lys Ile Asn Ser 450 460

Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp 465 470 475 480

Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly
485 490 495

Val Ala Pro Thr His Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg 500 505 510

Ala Val Gly Val Ile Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala 515 520 525

Gly Ser Thr Met Gly Ala Ala Ala Ile Thr Leu Thr Val Gln Ala Arg 530 535 540

Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala 545 550 555 560

Ile Glu Ala Gln Gln His Leu Leu Lys Thr Leu Val Trp Gly Ile Lys 565 570 575

Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Leu Arg Asp Gln 580 585 590

Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr 595 600 605

Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Thr Phe Asn Asp Ile 610 615 620

Trp Asn Met Thr Trp Leu Gln Trp Asp Lys Glu Ile Asn Asn Tyr Thr 625 630 635 640

Asn Thr Ile Tyr Arg Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys 645 650 655

Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Ser 660 665 670





Trp Phe Asp Leu Ser Asn Trp Leu Trp Tyr Ile Arg Ile Phe Ile Met 675 680 685

Val Val Gly Gly Leu Ile Ala Leu Arg Ile Val Phe Ala Val Leu Ala 690 695 700

Ile Ile Asn Arg Val'Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr 705 710 715 720

Leu Thr His His Gln Arg Glu Pro Asp Arg Pro Glu Gly Ile Glu Glu 725 730 735

Gly Gly Glu Gln Asp Arg Asp Arg Ser Val Arg Leu Val Asn Gly
740 745 750

Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser 755 760 765

Tyr His Arg Leu Arg Asp Leu Leu Leu Ile Ala Ala Arg Thr Val Glu 770 780

Leu Leu Gly His Ser Ser Leu Lys Gly Leu Arg Leu Gly Trp Gly Ala 785 790 795 800

Leu Lys Tyr Leu Trp Asn Leu Leu Ser Tyr Trp Gly Gln Glu Leu Lys $805 \hspace{1.5cm} 810 \hspace{1.5cm} 815$

Asn Ser Ala Ile Asn Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Asn 820 825 830

Trp Thr Asp Arg Val Ile Glu Ile Gly Gln Arg Phe Gly Arg Ala Ile 835 840 845

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24

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47 4l, 47.5 1l 17.6 11p 14p 14.	:	•		
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÷	<u>, </u>			
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